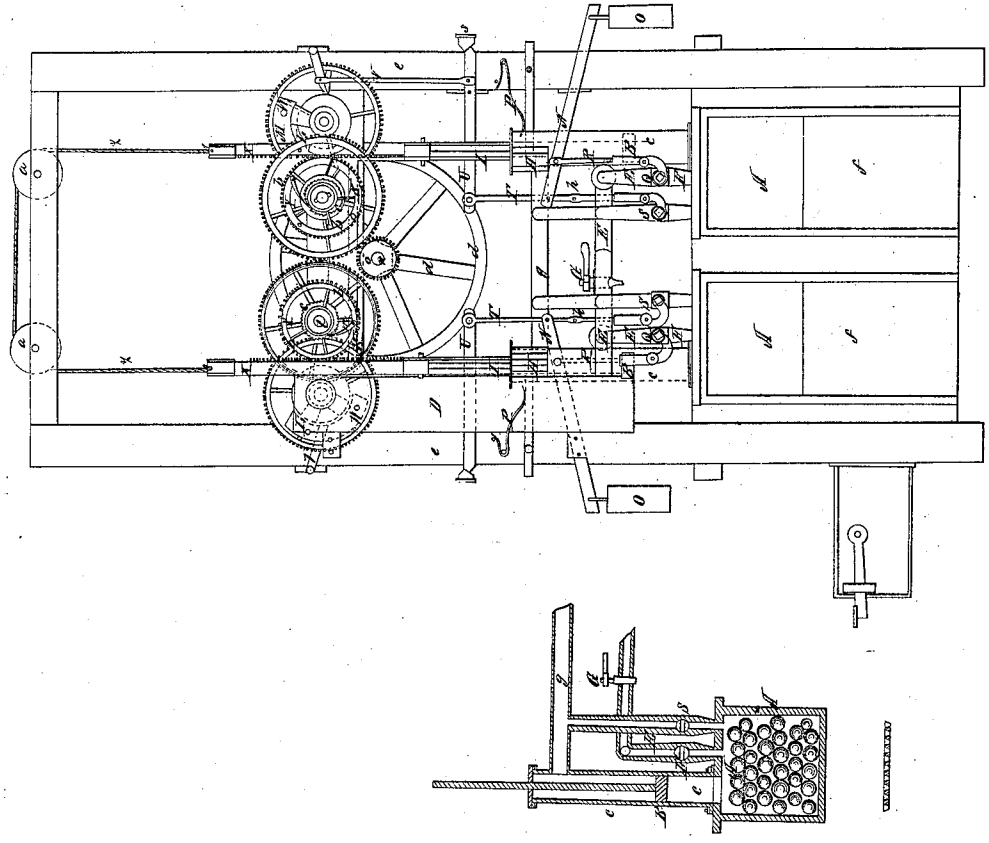
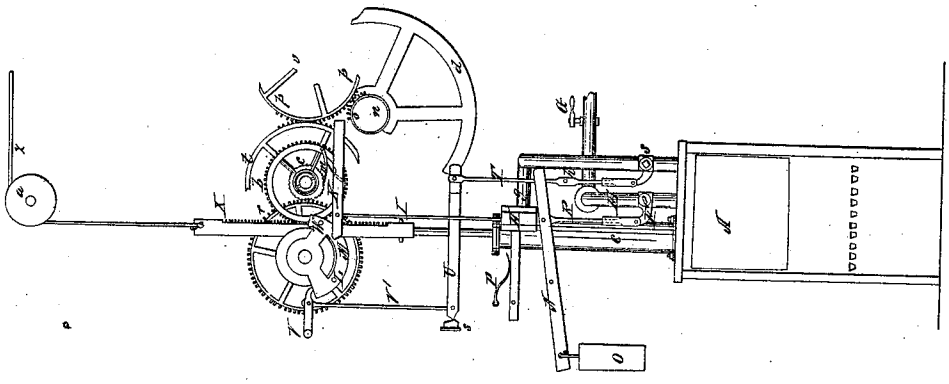
Sheet 1-2 Sheets.

E. D. Tippett,

Reciprocating Steam Engine,

Patented Nov. 23, 1836





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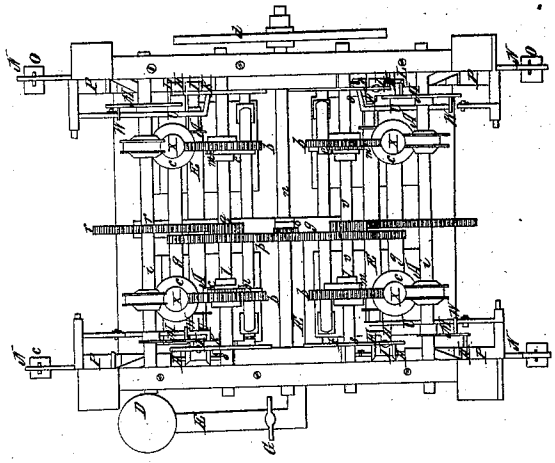

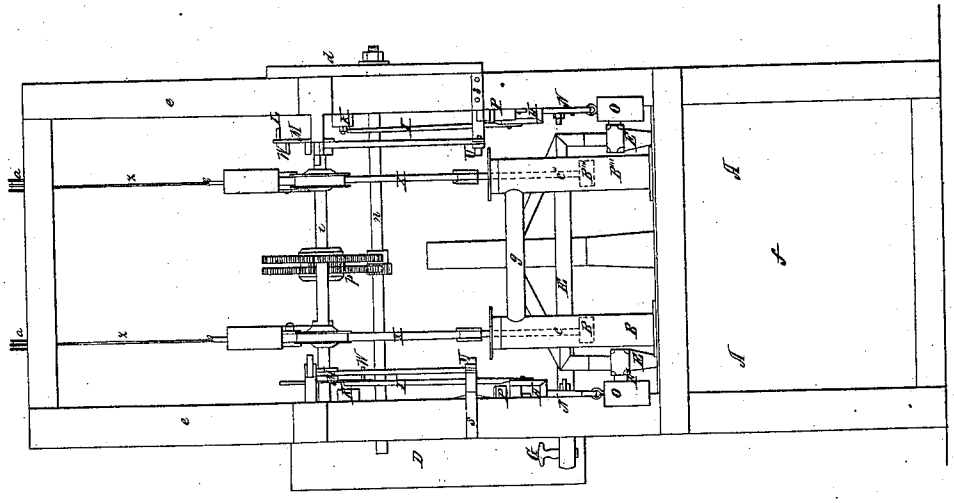

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UNITED STATES PATENT OFFICE.

EDWARD D. TIPPITT, OF WASHINGTON, DISTRICT OF COLUMBIA.

SAFETY STEAM-ENGINE.

Specification of Letters Patent No. 84, dated November 23, 1836.

To all whom it may concern:

Be it known that I, EDWARD D. TIPPITT, of the county of Washington and District of Columbia, have invented a new, and useful Safety Steam-Engine, and that the following is a full an exact description thereof, to wit, reference being had to the annexed drawings of the same, making part of this specification.

The nature of my invention consists in generating steam by injecting small quantities of water into hot generators (A,) filled with balls or plates of iron heated to a proper heat which is converted into steam instantaneously, and acts upon the piston, B, (without a boiler) and which escapes immediately upon the ascent of the piston through an aperture into the escape tube *g*, where the steam may be condensed, or otherwise, leaving neither water or steam to cause an explosion. The generators may be made of cast, or wrought iron or copper, either cylindrical, or square, and in proper proportions, the content of which being about two cubical feet more, or less according to the power of the engine, or the quantity of water to be generated into steam. These generators are to be packed full of iron plates or balls not exactly in contact in all points, to retain heat, at the same time so packed as to admit the water between them, and to form as much surface as possible to generate the steam. It is also for another important purpose which will be here explained. If the generators are not packed with iron they must of course be filled with steam to a certain power upon the square inch according to the power of the engine required, in order to obtain that elasticity necessary to drive the machinery, hence it will be seen that a great body of steam would have to be discharged at every stroke of the piston, but by filling the generators with iron, there is no more steam produced than that which is necessary to fill the cylinder; and this is regulated by the quantity of water discharged into the generators; the steam from which upon the ascent of the piston immediately escapes through the upper escape into the escape tube (*g*) opened by the ascent of the piston.

The water is contained in a reservoir D, kept full by a common pump worked in the ordinary manner, the same is conveyed by pipes E, to each generator, and small quantities are admitted through a valve, F, into the same alternately.

Motion is given to the valves by the rotary movement of the engine, and is calculated so as to let into the generators, any given quantity of water according to the power of the engine required. The engine is put into motion by turning a common valve G, introduced in the pipe through which the water passes from the reservoir to the generators, at which place it passes through the valve, F, and is regulated by a mechanical action of equal time, and admitted into the generators according to the size of the aperture through which it passes. If it is found on any occasion that the powers of the engine should be less than the given power it is instantly effected by turning the valve G, through which the water passes to the generator, and lessening the aperture to any degree according to the power required, by which the power of the engine is calculated, and at all times regulated.

The action of each valve F, through which the water passes immediately into the generators, is performed by a tilt hammer H, worked by the rotary movement of the engine; and which is connected to a lever K, by a rod I. The lever is moved, or raised by a pin, L, set into a segment of a circle, or an arm M, upon the axis (i,) one of the wheels of the engine, and which lifts the hammer, to a given distance, and suddenly lets the hammer fall upon the end of another lever N, on the end of which is a weight O, suspended greater than the weight of the hammer, but the fall of the hammer aided by a spring P, drives this end of the lever down to a given distance which opens the valve F, by a connecting rod R, and admits the water, and at the same time strikes a pin *h*, in the rod connected to the vent valve S, and drives it down, and closes this valve, and instantly the weight O, upon the other end of the lever regains its specific gravity, and brings the tilt hammer back to its former position, closing the water valve F. Thus it will be seen that the valve F, through which the water is discharged into the generators is opened, and closed in a given time by the rod R, connected to the lever N, and to the valve, and which will discharge a given quantity of water in that given time according to the size of the aperture open, but it